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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/661,281	09/14/2000	Noboru Mohri	43890-439	6246

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McDermott Will & Wmery
600 13th Street NW
Washington, DC 20005-3096

EXAMINER

PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
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2841

MAIL DATE	DELIVERY MODE
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08/09/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/661,281	MOHRI ET AL.	
	Examiner	Art Unit	
	Ishwar (I. B.) Patel	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 33,34,36-43,53 and 54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 33,34,36-43,53 and 54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/041,666.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 24, 2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 33, 37-39, 43, 53 and 54 are rejected under 35 U.S.C. 102(b) as being anticipated by Enomoto (US Patent No. 5,589,255).

Regarding claim 33, Enomoto in figure (1c) discloses a circuit substrate comprising: a substrate (3) including a first surface (surface in contact with element 2) and a second surface opposite to the first surface (the other surface of substrate 3); a first conductor pattern (1) formed on the first surface; and a second conductor pattern (5) formed on the second surface. The second surface has larger surface roughness than the first surface (see figure, as the second surface roughened for better adhesion).

Regarding the limitations “the first surface is adapted for mounting a device smaller than the substrate” and “the second surface is adapted for mounting to a second substrate,” require that substrate has the ability to have a device mounted and the ability to have a second substrate mounted. It has been held that the recitation that an element is “adapted to” perform a function is not a positive limitation but requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. As these recitation does not result in any structural difference of the substrate of Enomoto meets the limitations.

Regarding claim 37, Enomoto further discloses a through hole in the substrate connecting the first and second surface (see figure).

Regarding claim 38, Enomoto further discloses an electrode filled in the through hole (see figure).

Regarding claim 39, Enomoto further discloses an electrode formed along the through hole (see figure).

Regarding claim 43, Enomoto further discloses a dielectric layer formed on at least a portion of the second conductor patterns; and a third conductor pattern formed on the dielectric layer (see figure 1d).

Regarding claim 53, Enomoto further discloses an insulating layer covering the second conductor pattern on the second surface (see figure 1d).

Regarding claim 54, Enomoto further discloses an electrode filled in the through hole of the substrate (see figure 1c), wherein the electrode connects the first conductor pattern with the second conductor pattern, and the second conductor pattern covers the electrode on the second surface and includes the same metal as the electrode (see figure 1d).

4. Claim 33 is rejected under 35 U.S.C. 102(b) as being anticipated by Fujinaka (US Patent No. 4,806,334).

Regarding claim 33, Fujinaka in figure (1) discloses a circuit substrate comprising: a substrate (1,3) including a first surface (surface with wiring pattern 4) and a second surface opposite to the first surface (surface with pattern 2); a first conductor pattern (4) formed on the first surface; and a second conductor pattern (2) formed on the second surface. The second surface has larger surface roughness than the first surface (as the first surface is glazed surface with is less roughened than the second surface).

Regarding the limitations "the first surface is adapted for mounting a device smaller than the substrate" and "the second surface is adapted for mounting to a second substrate," require that substrate has the ability to have a device mounted and the ability to have a second substrate mounted. It has been held that the recitation that

an element is "adapted to" perform a function is not a positive limitation but requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. As these recitation does not result in any structural difference of the substrate of Fujinaka meets the limitations.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 33, 34 and 36-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi (US Patent No. 5,943,212) in view of Enomoto (US Patent No. 5,589,255).

Regarding claim 33, Horiuchi in figure (1 and 8) discloses a circuit substrate comprising: a substrate (32-40) including a first surface (surface with pattern 34) and a second surface opposite to the first surface (surface with pattern 14); a first conductor pattern (34) formed on the first surface; and a second conductor pattern (14) formed on the second surface.

Horiuchi does not explicitly disclose the second surface has larger surface roughness than the first surface.

However, Horiuchi discloses the first pattern formed on the surface with screen printing, which does not need any specific surface finish, whereas the second surface is

formed on resin with laminating copper film. It is old and known to have the resin surface roughened to have better adhesion with subsequent copper pattern to be formed on the surface.

Enomoto discloses roughening the surface of resin to have a better adhesion with subsequent pattern (figure 1b).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the substrate of Horiuchi with the second surface roughened, as taught by Enomoto, in order to have a better adhesion of the copper film.

Regarding the limitations "the first surface is adapted for mounting a device smaller than the substrate" and "the second surface is adapted for mounting to a second substrate," require that substrate has the ability to have a device mounted and the ability to have a second substrate mounted. It has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. As these recitation does not result in any structural difference of the substrate of Horiuchi meets the limitations.

Regarding claim 34, the modified board of Horiuchi further discloses an external terminal formed on the second conductor pattern (see figure 8).

Regarding claim 36, the modified board of Horiuchi further discloses the external a ball-shaped solder (see figure 8).

Regarding claim 37, the modified board of Horiuchi further discloses a through hole in the substrate connecting the first and second surface (see figure).

Regarding claim 38, the modified board of Horiuchi further discloses an electrode filled in the through hole (see figure).

Regarding claim 39, the modified board of Horiuchi further discloses an electrode formed along the through hole (see figure).

Regarding claim 40, the modified board of Horiuchi further discloses the external terminal is connected directly underneath the electrode (see figure 8).

Regarding claim 41, the modified board of Horiuchi discloses all the features of the claimed invention as applied to claim 39 above, but does not disclose a solder filled in the through hole. However, solder (20) filled in the via hole, as disclose in figure 11 is old and known in the art to have better connection with the pads.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified board of Horiuchi with a solder filled in the through hole, in order to have better adhesion of the board.

Regarding claim 42, the modified board of Horiuchi discloses all the features of the claimed invention as applied to claim 41 above, but does not disclose the solder has a higher melting point than the external terminal. However, it can be seen from the figure the terminals will be used to connect the board with other substrate by reflowing the solder ball 12 and the melting temperature of the solder in the hole has to be higher than that of the solder ball, other wise the solder in the holes will melt and cause short circuit on the connecting board and / or defect in the via hole.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified board or Horiuchi with the solder having a higher melting point than the external terminal, in order to avoid melting of the solder causing short circuit on the connecting board and avoiding defect in the via hole.

Response to Arguments

7. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

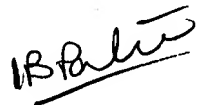
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

Art Unit: 2841

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on (571) 272 1984. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ibp
August 5, 2007


Ishwar (I. B.) Patel
Primary Examiner
Art Unit: 2841